# Refine Search

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| (16 AND 23).USPT. | 0 |
| (L16 AND L23 ).USPT. | 0 |

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US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:** L25

Refine Search

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## Search History

**DATE: Friday, March 19, 2004** Printable Copy Create Case

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| | *DB=USPT; PLUR=YES; OP=OR* | | |
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| L23 | l3 and L22 | 34 | L23 |
| L22 | wt and L2 | 119 | L22 |
| L21 | l14 and L20 | 0 | L21 |
| L20 | wt and L6 | 27 | L20 |
| L19 | l16 and L18 | 2 | L19 |
| L18 | wt and L14 | 133 | L18 |
| L17 | glassy and L16 | 0 | L17 |
| L16 | viscoelastic and L15 | 2 | L16 |
| L15 | damp$6 and L14 | 11 | L15 |
| L14 | (structural adj lamin$6) and impregnat$5 | 156 | L14 |
| L13 | (structural adj lamina) and l9 | 0 | L13 |

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| L12 | (structural adj lamina) and L3 | 0 | L12 |
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| L10 | l3 and L9 | 6 | L10 |
| L9 | l2 and L8 | 12 | L9 |
| L8 | thermosetting adj resin | 22228 | L8 |
| L7 | glassy and L6 | 1 | L7 |
| L6 | viscoelastic and l2 | 31 | L6 |
| L5 | plastisizer and L1 | 4 | L5 |
| L4 | plastisizer and L3 | 0 | L4 |
| L3 | impregnat$5 and L2 | 37 | L3 |
| L2 | (composite adj laminat$5) and L1 | 137 | L2 |
| L1 | damping | 58250 | L1 |

END OF SEARCH HISTORY

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L16: Entry 1 of 2 File: USPT Apr 20, 1999

DOCUMENT-IDENTIFIER: US 5894651 A
TITLE: Method for encapsulating a ceramic device for embedding in composite structures

Abstract Text (1):
A piezoelectric actuator/sensor package and corresponding method for its fabrication, and a method of embedding a ceramic actuator/sensor in a laminated structural member, such as a graphite-epoxy laminate. A ceramic actuator/sensor, with lead wires first bonded to it, is encapsulated in a non-conductive fiber composite material, such as fiberglass cloth and epoxy, to form a package that is precured at a suitable temperature, typically room temperature. Encapsulation provides electrical insulation, good strain coupling, protection from mechanical damage, and reduction in thermal stresses, since the coefficient of thermal expansion of the encapsulating material is selected to be between those of the ceramic and the graphite-epoxy laminate. Graphite fibers may be added to the package to enhance voltage-strain performance. The package is embedded in the structural laminate and the composite structure is cured in a manner that minimizes thermally-induced stresses. Piezoelectric prestressing, during the embedment step, may be used to further reduce the effects of thermal stresses.

Brief Summary Text (3):
Passive energy dissipation typically uses layers of viscoelastic materials, either embedded in structural members or applied at structurally joints. Viscoelastic materials have the useful property that their stiffness increases with the rate at which they are mechanically stressed. Therefore, a viscoelastic member is subject to relatively high damping forces when vibrating rapidly, and lower damping forces when deformed more slowly. Although significant levels of damping can be obtained by passive means, static strength is reduced by the presence of the viscoelastic materials, since structural members must be reduced in stiffness at certain locations in order to introduce energy into the viscoelastic material. Also, since the properties of viscoelastic materials are highly temperature dependent, a thermal thermal control system must be used in space structures, to maintain them at the desired operating conditions. This is costly in terms of both power consumption and weight, and in some cases thermal control is not possible at all.

Brief Summary Text (4):
The active damping approach employs actuators, which, operating in conjunction with deformation sensors, apply damping forces to compensate for vibrational and other loading forces on structures. Static structural strength and stiffness are not compromised by active damping, and many ceramic actuator materials can retain their properties over a much larger temperature range than passive damping structures. In many cases thermal control systems are not needed if active damping is used.

Brief Summary Text (5):
The principal difficulty with actively damped structures is that of embedding ceramic actuators in composite materials. The most efficient actuator materials are piezoelectric ceramics, such as lead zirconate titanate (PZT), and electrostrictive ceramics, such as lead molybdenum niobate (PMN). Piezoelectric materials can be used as actuators, since a voltage applied to them causes structural deformation in

a selected direction, or as sensors, whereby a deformation in a selected direction induces a measurable voltage. Unfortunately, most ceramic materials are relatively brittle and have a large positive coefficient of thermal expansion (CTE). Graphite fiber-reinforced epoxies have a zero or slightly negative CTE. When a graphite fiber fiber reinforced epoxy is cured at elevated temperatures, and subsequently cooled, tensile stresses are induced in the embedded ceramic materials. Resultant cracking will degrade ceramic actuator performance significantly, if not totally. Another difficulty is the need to insulate actuators electrically from conductive graphite fibers in the composite materials in which the actuators are embedded. Ceramic actuators and sensors have two electroplated surfaces with attached connecting leads leads that must be insulated. Yet another problem is the inherent fragility of the actuators, which may lead to breakage even prior to embedment in a composite structure.

Brief Summary Text (7):
It will be appreciated from the foregoing that there is still a need for improvement in the field of piezoelectric ceramic sensors and actuators as applied to active damping of composite structures. The present invention is directed to this this end.

Detailed Description Text (8):
An alternate encapsulating material 20 is a pre-impregnated fiberglass or KEVLAR (manufactured by DuPont) cloth having a low temperature curing epoxy resin, preferably less than 250.degree.. The resin content of the insulating cloth should be high, greater than 50% by weight. A high resin content forms an epoxy matrix that coats the fibers and fills in gaps in the fabric weave that would otherwise form pinholes in the package. A high resin content is also desirable to provide desired mechanical properties, such as a relatively high CTE, which can be controlled to some degree by the specific resin content used.

CLAIMS:

5. An actuator/sensor package as defined in claim 1, wherein:

the encapsulating material is KEVLAR impregnated with epoxy.

TITLE: Structural panel and method of manufacture

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. De

5. Document ID: US 5894651 A

L15: Entry 5 of 11 File: USPT Apr 20, 1999

US-PAT-NO: 5894651
DOCUMENT-IDENTIFIER: US 5894651 A

TITLE: Method for encapsulating a ceramic device for embedding in composite structures

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. De

6. Document ID: US 5830548 A

L15: Entry 6 of 11 File: USPT Nov 3, 1998

US-PAT-NO: 5830548
DOCUMENT-IDENTIFIER: US 5830548 A
**** See image for Certificate of Correction ****

TITLE: Articles of manufacture and methods for manufacturing laminate structures including inorganically filled sheets

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. De

7. Document ID: US 5305507 A

L15: Entry 7 of 11 File: USPT Apr 26, 1994

US-PAT-NO: 5305507
DOCUMENT-IDENTIFIER: US 5305507 A

TITLE: Method for encapsulating a ceramic device for embedding in composite structures

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. De

8. Document ID: US 5268055 A

L15: Entry 8 of 11 File: USPT Dec 7, 1993

US-PAT-NO: 5268055
DOCUMENT-IDENTIFIER: US 5268055 A

TITLE: Method for making perforated composite laminates

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

9. Document ID: US 4783363 A

L15: Entry 9 of 11 File: USPT Nov 8, 1988

US-PAT-NO: 4783363
DOCUMENT-IDENTIFIER: US 4783363 A

TITLE: Curable compositions containing a polyepoxide and a halogenated bisphenol

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

10. Document ID: US 4461666 A

L15: Entry 10 of 11 File: USPT Jul 24, 1984

US-PAT-NO: 4461666
DOCUMENT-IDENTIFIER: US 4461666 A

TITLE: Contoured balsa-core laminate

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

11. Document ID: US 4234190 A

L15: Entry 11 of 11 File: USPT Nov 18, 1980

US-PAT-NO: 4234190
DOCUMENT-IDENTIFIER: US 4234190 A
**** See image for Certificate of Correction ****

TITLE: Carbon fiber-reinforced plastic arrow

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

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| Term | Documents |
|---|---|
| DAMP$6 | 0 |
| DAMP | 22801 |
| DAMPA | 2 |
| DAMPABLE | 20 |
| DAMPADD | 1 |

| | |
|---|---|
| DAMPAER | 1 |
| DAMPAGE | 1 |
| DAMPAGED | 1 |
| DAMPALA | 2 |
| DAMPANED | 3 |
| DAMPANT | 2 |
| (DAMP$6 AND L14).USPT. | 11 |

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1. Document ID: US 6664359 B1

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L7: Entry 1 of 1                File: USPT                Dec 16, 2003

US-PAT-NO: 6664359
DOCUMENT-IDENTIFIER: US 6664359 B1

TITLE: Tackified polydiorganosiloxane polyurea segmented copolymers and a process
for making same
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Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

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| Term | Documents |
|---|---|
| GLASSY | 16431 |
| GLASSIES | 0 |
| GLASSYS | 0 |
| (6 AND GLASSY).USPT. | 1 |
| (GLASSY AND L6).USPT. | 1 |

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L11: Entry 1 of 2 File: USPT Jan 6, 2004

DOCUMENT-IDENTIFIER: US 6675112 B1
TITLE: Cure monitoring

Brief Summary Text (2):
This invention relates to the monitoring of solidification of plastics resins, and in particular relates to monitoring the curing of adhesively bonded or sealed joints, monitoring the cure of thermosetting resins and monitoring the cure of composite materials comprising plastics resins.

Brief Summary Text (30):
By correlating the output signal behaviour with a database of known behaviour for individual materials or structures particular physical, mechanical or chemical properties of the resins may be obtained sampled or monitored over a time period. This can be used to provide data useful for indicating when to apply pressure to bonds or composite laminates, or when pressure may be released or products released from moulds. The skilled person will be able to make wide use of the present invention in the field of polymer processing.

Detailed Description Text (10):
At an initial liquid phase, the resonant frequency of the bond is low and the signal amplitude high but changing slightly. This suggests that the resin is in an initial liquid phase with some reaction occurring producing slight changes in viscosity of the resin. It should be noted at this point that the transducers used in the experiment only measure movement in a vertical direction. The signal amplitude values associated with a bond containing uniform liquid resin are very much smaller than those associated with a void, due to the viscoelastic damping effects of the viscous resin.

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**Search Results -** Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 6675112 B1

L11: Entry 1 of 2 File: USPT Jan 6, 2004

US-PAT-NO: 6675112
DOCUMENT-IDENTIFIER: US 6675112 B1

TITLE: Cure monitoring

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

☐ 2. Document ID: US 4223073 A

L11: Entry 2 of 2 File: USPT Sep 16, 1980

US-PAT-NO: 4223073
DOCUMENT-IDENTIFIER: US 4223073 A
**** See image for Certificate of Correction ****

TITLE: High-temperature damping composite

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

| Term | Documents |
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| (9 AND 6).USPT. | 2 |
| (L6 AND L9).USPT. | 2 |

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**Search Results -** Record(s) 1 through 11 of 11 returned.

☐ 1. Document ID: US 6696164 B2

L15: Entry 1 of 11 File: USPT Feb 24, 2004

US-PAT-NO: 6696164
DOCUMENT-IDENTIFIER: US 6696164 B2

TITLE: Structural panel and method of manufacture

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 2. Document ID: US 6546694 B2

L15: Entry 2 of 11 File: USPT Apr 15, 2003

US-PAT-NO: 6546694
DOCUMENT-IDENTIFIER: US 6546694 B2

TITLE: Light-weight structural panel

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 3. Document ID: US 6419774 B1

L15: Entry 3 of 11 File: USPT Jul 16, 2002

US-PAT-NO: 6419774
DOCUMENT-IDENTIFIER: US 6419774 B1

TITLE: Structural panel and method of manufacture

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 4. Document ID: US 6171705 B1

L15: Entry 4 of 11 File: USPT Jan 9, 2001

US-PAT-NO: 6171705
DOCUMENT-IDENTIFIER: US 6171705 B1